
Marine Physical Laboratory

Postgraduate Support for Acoustics and Signal Processing in Waveguides Bounded by Inhomogeneous Biot Type Sediments

W. S. Hodgkiss

Supported by the
Chief of Naval Research
N00014-94-1-0784

Final Report

MPL-U-11/97
July 1997

19971230 085

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DTIC QUALITY INSPECTED 6

University of California, San Diego
Scripps Institution of Oceanography

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. Agency Use Only (Leave Blank).		2. Report Date. July 1997		3. Report Type and Dates Covered. Final Report
4. Title and Subtitle. Postgraduate Support for Acoustics and Signal Processing in Waveguides Bounded by Inhomogeneous Biot Type Sediments			5. Funding Numbers. N00014-94-1-0784	
6. Author(s). W. S. Hodgkiss			Project No. Task No.	
7. Performing Monitoring Agency Name(s) and Address(es). University of California, San Diego Marine Physical Laboratory Scripps Institution of Oceanography San Diego, California 92152			8. Performing Organization Report Number. MPL-U-11/97	
9. Sponsoring/Monitoring Agency Name(s) and Address(es). Office of Naval Research Ballston Centre Tower One 800 North Quincy Street Arlington, VA 22217-5660 Robert Gisinier, Code 3410A			10. Sponsoring/Monitoring Agency Report Number.	
11. Supplementary Notes.				
12a. Distribution/Availability Statement. Approved for public release; distribution is unlimited.			12b. Distribution Code.	
13. Abstract (Maximum 200 words). A range-dependent model incorporating the Biot theory of acoustic propagation in a fluid-filled porous media was implemented and used to investigate the optimum frequency of propagation in shallow water waveguides at high frequency.				
14. Subject Terms. acoustic propagation, phase conjugation method,			15. Number of Pages. 2	
			16. Price Code.	
17. Security Classification of Report. Unclassified	18. Security Classification of This Page. Unclassified	19. Security Classification of Abstract. Unclassified	20. Limitation of Abstract. None	

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June 1, 1994 - November 30, 1995**

Abstract

A range-dependent model incorporating the Biot theory of acoustic propagation in a fluid-filled porous media was implemented and used to investigate the optimum frequency of propagation in shallow water waveguides at high frequency.

Research Objectives

The objective of this effort was to implement a range-dependent model incorporating the Biot theory of acoustic propagation in a fluid-filled porous media and then use this model to investigate issues related to high frequency propagation in shallow water waveguides.

Research Summary

Biot developed a theory for acoustic propagation in fluid-filled porous media which predicts the existence of two compressional acoustic waves. The faster wave corresponds to the compressional wave propagating

References

through a solid medium and the slower wave rapidly attenuates. Collins at the Naval Research Laboratory extended the parabolic equation (PE) method to handle problems involving poro-elastic layers [1]. This code was used to investigate the optimum frequency of propagation in very shallow water waveguides at high frequency (e.g. coastal shallow water regions). The results of this research are reported in [2].

References

M.D. Collins, W.A. Kuperman, and W.L. Siegmann, "A parabolic equation for poro-elastic media," J. Acoust. Soc. Am. 98: 1645-1656 (1995).

A. Abawi, W.S. Hodgkiss, W.A. Kuperman, and M.D. Collins, "On measuring sediment/Biot properties in shallow water at moderate to high frequencies," J. Acoust. Soc. Am. 96: 3265 (1994).

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